REMARKS

Claims 1-17, 21 and 24-25 were previously pending, of which claims 1, 12, 21, and 25 have been amended. Reconsideration of presently pending claims 1-17, 21, and 24-25 is respectfully requested in light of the above amendments and the following remarks.

Objections to the Drawings

The drawings were objected to under 37 CFR 1.83(a). The Examiner argues that the requirement drawings must show every feature of the invention specified in the claims is not met. In particular, the Examiner cites that "depositing a first metal layer on the dielectric layer and the first metal layer such that an interface is formed directly between the first metal layer and a lower surface of the glue layer and an interface is formed directly between the dielectric layer and a lower surface of the glue layer" is omitted from the drawings. The Applicants respectfully disagree. However, the claims have been amended to broaden the claim and require the position of the dielectric layer as formed *adjacent* the first metal layer, omitting the terminology of forming the dielectric layer *on* the first metal layer.

Figure 3 of the current disclosure is reproduced below and illustrates an embodiment of the limitations of the clause at issue.

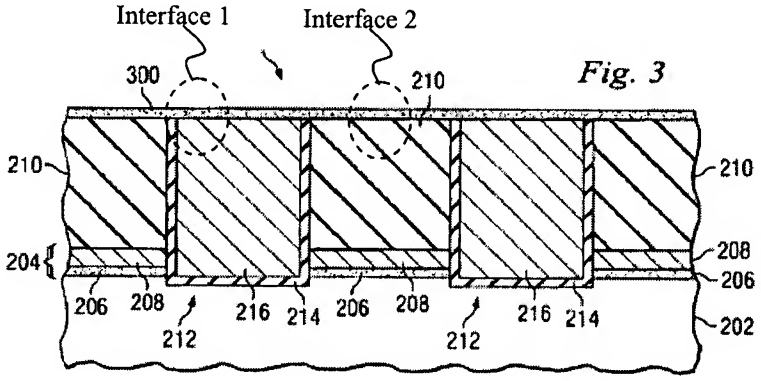

Fig. 3

For example, a first metal layer 214/216 is adjacent a dielectric layer 210; a glue

layer 300 is on the dielectric layer 210; an interface (denoted as interface 1) formed directly between the first metal layer 214/216 and a lower surface of the glue layer 300; and an interface (denoted as interface 2) is formed directly between the dielectric layer 210 and a lower surface of the glue layer 300.

Rejections under 35 U.S.C. §112

Claims 12 and 21, and the claims that depend therefrom, were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner argues that the limitation of "depositing a first metal layer on the dielectric layer; depositing a glue layer on the dielectric layer and the first metal layer such that an interface is formed directly between the first metal layer and a lower surface of the flue layer and an interface is formed directly between the dielectric layer and a lower surface of the glue layer" does not have support in the specification. The Applicant's respectfully disagree.

Claim 12, as amended requires in part:

> ...depositing a first metal layer adjacent the dielectric layer; depositing a glue layer on the dielectric layer and the first metal layer such that an interface is formed directly between the first metal layer and a lower surface of the glue layer and an interface is formed directly between the dielectric layer and a lower surface of the glue layer...

Claim 21, as amended requires in part:

> ...forming a first metal layer adjacent the dielectric layer; forming a glue layer on the first metal layer such that an interface is formed directly between metal of the first metal layer and a lower surface of the glue layer and an interface is formed directly between the dielectric layer and a lower surface of the glue layer...

As illustrated above, the limitations are supported in the specification at least by Fig. 3, reproduced above, and the written description accompanying Fig. 3. For example, a first metal layer 214/216 is adjacent a dielectric layer 210; a glue layer 300 is on the dielectric layer 210 and the first metal layer 214/216; an interface (denoted above as

interface 1) formed directly between the first metal layer 214/216 and a lower surface of the glue layer 300; and an interface (denoted above as interface 2) is formed directly between the dielectric layer 210 and a lower surface of the glue layer 300.

Thus, for at least this reason, the rejection of claims 12 and 21, and the claims that depend therefrom should be withdrawn.

Rejections under 35 U.S.C. § 102

Claims 1, 3-6, and 25 were rejected under 35 U.S.C. §102(b) as being anticipated by Dixit et al. (US Patent No. 6,355,558 hereinafter referred to as "Dixit"). As set forth at MPEP §2131, it is well-established:

> A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

With respect to the claims as herein amended, this rejection is respectfully traversed.

Claim 1 requires in part:

> A method...comprising: forming a glue layer directly on the first layer, wherein the first layer includes a metal layer; performing an inter-treatment on the glue layer, wherein the inter-treatment affects the upper and lower surfaces of the glue layer and improves an adhesive interface between the glue layer and the first layer and wherein the inter-treatment includes applying a plasma and an electron beam...wherein the inter-treated glue layer improves adhesion...

Claim 25 requires in part:

> A method...comprising: forming a first metal layer; forming a glue layer directly on the first metal layer, wherein the glue layer is an etch stop layer and includes silicon; performing an inter-treatment on the glue layer to alter upper and lower surfaces of the glue layer for improved adhesiveness wherein the inter-treatment includes using at least one of a plasma and an electron beam...

The Examiner states that Dixit teaches a first layer 42, a second layer 46, and a glue layer 44. Dixit describes a TiN layer 44 as a barrier material that may act as a wetting layer (col. 4 lines 45-46), a wetting layer 42 of refractory metal, and a refractory metal layer 46. The

Examiner argues that the inter-treatment required by claim 1 is disclosed by Dixit in col. 4, lines 52-62. This portion of Dixit however discusses a fortification step to "stuff" the barrier layer 44. The fortification step requires a high temperature anneal. A high temperature anneal does not teach an inter-treatment including using a plasma and/or an electron beam as is required by the claims. A plasma process and a high temperature anneal process are distinct processes used in semiconductor manufacturing. For example, as known in the art, a plasma process requires an ionized gas. A high temperature anneal, including an anneal in, for example, an H_2 atmosphere, does not require an ionized gas. In addition, claim 1 as amended, requires an inter-treatment including a plasma and an electron beam. The barrier fortification step of layer 44 described in Dixit also does not include an electron beam. Furthermore, claim 25 as amended requires the glue layer is an etch stop layer including silicon. Layer 44, referenced by the Examiner as teaching a glue layer, is a TiN layer. As such, Dixit does not teach all the elements of claim 25.

The metal layer 46 of Dixit is "treated with plasma" (col. 5, line 7-8), however, the layer 46 is not applicable to the claims as amended, as the layer 46 does not include a treatment including a plasma and an electron beam as required by claim 1. (See Col. 5 lines 7-30). The layer 46 a layer of refractory metal preferably Ti, thus does not include silicon as required by claim 25.

As such, for at least these reasons, Dixit does not teach all elements of independent claims 1 and 25. Therefore, the rejection is not supported by the Dixit reference and should be withdrawn.

Dependent Claims

Dependent claims 2-11, 13-17, and 24 depend from and further limit what are considered to be allowable claims, as such they are deemed to be patentable over the prior art.

Conclusion

An early formal notice of allowance of claims 1-17, 21, 24, and 25 is requested. The Examiner is invited to telephone the undersigned if further assistance is necessary.

Respectfully submitted,

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